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Open Science: A Review on Open Peer Review Literature

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Abstract

Peer review truly, is the king in scientific communication –however, traditional peer review has been accused of many irregularities such as inconsistency and unrealistic peer reviewing, methodology flaws, and the likes. Despite all these irregularities, scholars still believe in peer review but new ways of opening up peer reviews are encouraged. There were high levels of backing for most of the attributes of OPR, such as disclosing identities of reviewers, open reports, open interaction, open platform, commenting on the final-version of published articles or data. Furthermore, the idea of supplementing pre-publication peer review with some form of post-publication evaluation would improve scientific communication. Also, novel initiatives for OPR are reviewed and how they can speed up peer review in today scholarship. In conclusion, ways of making OPR not just a new science but a sound and reliable scientific exercise were elaborated. The purpose of this study is to review OPR literature and discuss the novel and sharp practices of OPR in today's scholarship

Keyword: Open Peer Review (OPR), Peer Review, Open Science, Scholarly Communication

1. Introduction

In actual fact, the online social web has transformed the way we create, converse and interact with knowledge. Openness is one of the main values in scholarly communication. Scientific practices such as open peer reviews (OPR) have many benefits including upholding the integrity of science, excluding invalid or low-quality research, ensuring control in scientific communication, filtering and determining the originality of the manuscript and improving the quality of research articles (Barroga, 2014; Danko & Malpede, 2015; Geithner & Pollastro, 2016; Guilford, 2001). As a fundamental practice of Open Science, OPR has neither a standardized definition nor an agreed schema of its features and implementations in science (Ford, 2013). However, for the purpose of this paper, we defined OPR as a term enabling reviewers and authors identities open, publishing review reports and allows greater participation and interactions in the peer review process. OPR has been used interchangeably with peer review where the identities of both authors and reviewers are published along with the publication articles. Some see it as a method where “invited experts” are able to comment, others view it as a variety of association of this novel approach (Alam & Patel, 2015; Herron, 2012; Woodall, South, Dixey,

de Viggiani, & Penson, 2015); [Ross-Hellauer, 2017](#)). In all these, recognizes the variation in the usage of open peer review, Ross-Hellauer systematically reviewed 122 articles about OPR and came up with a technical definition about OPR that is currently lacking to mean “an umbrella term for a number of overlapping ways that peer review models can be adapted in line with the ethos of Open Science, including making reviewer and author identities open, publishing review reports and enabling greater participation in the peer review process”. However, there are numerous fears about open peer reviews. Researchers have contradictory tastes of some aspects of OPR which include independent factors (such as open identities, open interactions, open reports, open participation, open pre-view manuscript, open platforms and final-version commenting), which have no required association with each other, and various advantages and setbacks. Appraisal of the effectiveness of these clashing constructs and comparison between them is problematic. Debates are potentially side-tracked (for example, raising issues of bias in peer reviewing, unsustainability of open peer reviewing due to few willing reviewers, lack of agreement on whether editors should leave referees free to decide for themselves whether or not to make themselves known to authors, growing resistance from reviewers on implementations to further innovations, lack of true transparency of the review process in OPR etc.) as well as when claims are made for the efficiency of OPR in general, despite comments based on one element or unique model for OPR (Bowman, 2014; Helmer, Schottdorf, Neef, & Battaglia, 2017; Strickland, 2015; Wang et al., 2016; Wierzbinski-Cross, 2017; Kalantzis, 2009; Fitzpatrick 2010; Mulligan, 2008) . Apart from the challenges faced by OPR, OPR is seen as a sound reliable science for academe. Recent study on OpenAIRE survey (2017) revealed that majority of the respondents favor OPR becoming mainstream scholarly practices of Open Science. A novel and surprising high levels of experience with OPR, with three out of four (76.2%) respondents reporting having taken part in an OPR process as author, reviewer or editor. There were also high levels of backing for most of the attributes of OPR, such as commenting on the final-version of published articles or data. Furthermore, the idea of supplementing pre-publication peer review with some form of post-publication evaluation would improve scientific communication (Ali & Watson, 2016; Ferreira et al., 2016; Geithner & Pollastro, 2016; Guilford, 2001; Knoepfler, 2015). Summarizing this fact is a strong and very encouraging omen for OPR in the academe however, caution must be taken to avoid a “one-size fits all” solution and to tailor such systems to different disciplinary contexts (Almquist et al., 2017; Ballantyne, Edmond, & Found, 2017; Yarris et al., 2017). Though, peer review has been in existence since mid-twentieth century (Kreiman, 2016; Twaij, Oussedik, & Hoffmeyer, 2014; Yaffe, 2009) but due to its defect, some scholars like (Suber, 2002; 2016; (Green & Chief, 2017; Wicherts, 2016)) advocate for openness in science. OPR is not just a new science but a sound and reliable scientific exercise. The aims of the study is to review OPR literature and discuss the novel and sharp practices of OPR in today’s scholarship.

2. Literature Review

General beliefs that the traditional model is subjected to disapproval and has been accused of inconsistency and unrealistic peer reviewing (Herron, 2012; Park, Peacey, & Munafò, 2014; Teixeira da Silva & Dobránszki, 2015; Vinther & Rosenberg, 2013). Studies of Kravitz and associate (2010); and Herron, (2012) reveal very weak levels of agreement at levels only slightly better than chance. Similarly, rejection and acceptance of papers are inconsistent, for instance, Peters and Ceci’s classic study found that 8 out 12 papers were rejected for methodology flaws when resubmitted to the same journals in which they had already been published (Peter and Ceci,

1982). One of the myths of peer review is that peer review is reliable according to Michael Nielsen¹ and every researcher has a story to tell about peer reviewing, the important paper that was unjustly rejected or silly editor who neglected their wise advice as a referee. In spite of this flaws, many scholars believed the system works fairly fine, overall (Helmer et al., 2017; Kreiman, 2016; Twaij et al., 2014; Wierzbinski-Cross, 2017). Also, Jefferson and associates (2002) surveyed published studies of biomedical peer review, they found that out of 19 studies that made attempt to eliminate obvious confounding factors, only two addressed the impact of peer review on quality, and just one addressed the impact on validity; while the rest of the studies were more concerned about the effect of double-blind reviews. More so, out of the three that identified the quality and validity of peer review, Jefferson and associates concluded that there were other problems associated with their studies which suggested that the results were of limited general interest as they sound, “Editorial peer review, although widely used, but largely untested and its effect are unreliable”. Furthermore, in the study of David Horrobin (1990), who lists suppressing of researchers innovation by peer review for instance, a study of George Zweig’s paper that publicizing the unearthing of quarks, one of the essential building blocks of matter, was rejected by Physical Review Letters and this was eventually published as a CERN report (Kalantar Motamedi, 2013; O’Dowd, 2014; Spier, 2002). Another study is Wakefield et al., (1998) which is one of the most famous example in *Lancet* paper that suggested that the MMR (measles, mumps, rubella vaccine) caused autism: the result was a drop off in the number of children vaccinated, epidemics of measles, and more than a decade of fruitless argument. Also, a study in the *New England Journal of Medicine* article that seemed to show that a new drug for arthritis, rofecoxib, was safer than the traditional non-steroidal anti-inflammatory drugs because it was less likely to cause gastrointestinal bleeding (Bombardier et al., 2000). Unfortunately, the flawed paper hid the increase in myocardial infarctions. The paper was important in the new drug being widely used and in causing thousands of patients to have heart attacks. Furthermore, Berson and Yalow’s work on radioimmunoassay, which led to a Nobel Prize, was rejected by both Science and the Journal of Clinical Investigation. This work was finally published in the Journal of Clinical Investigation (Hansson & Schlich, 2015; Hopewell et al., 2014; Saeidnia & Abdollahi, 2015). Furthermore, the study of Krebs on citric acid cycle, that led to a Nobel Prize was equally rejected by Nature and later published in *Experientia* (de Castro Fonseca, Aguiar, da Rocha Franco, Gingold, & Leite, 2016; Hansson & Schlich, 2015; Hopewell et al., 2014; Rochon et al., 2002). Lastly, Horrobin looked into the study of Wiesner who introduced quantum cryptography and was rejected too by peer review and later appeared well over a decade after it was written. From the look of things, one can argue that peer review is at best imperfect filter for validity and quality of research and sometimes discourage innovation and openness in science (Ballantyne et al., 2017; Li & Agha, 2015; Steinhäuser et al., 2012).

However, some scholars still believed that peer review is one of the sacred pillars of the scientific edifice, irrespective of the flaws, majority believed it is a king in academe (Nicholas et al., 2015; Blockeel, Drakopoulos, Polyzos, Tournaye, & García-Velasco, 2017; Driggers, 2015; Gennaro, 2015; Jefferson, Wager, & Davidoff, 2002; Kurdi, 2015; Le Bailly, 2016; Shriki & Bhargava, 2015; Smith & Milnes, 2016; Wagner & Bates, 2016; Wierzbinski-Cross, 2017), and Goodstein,

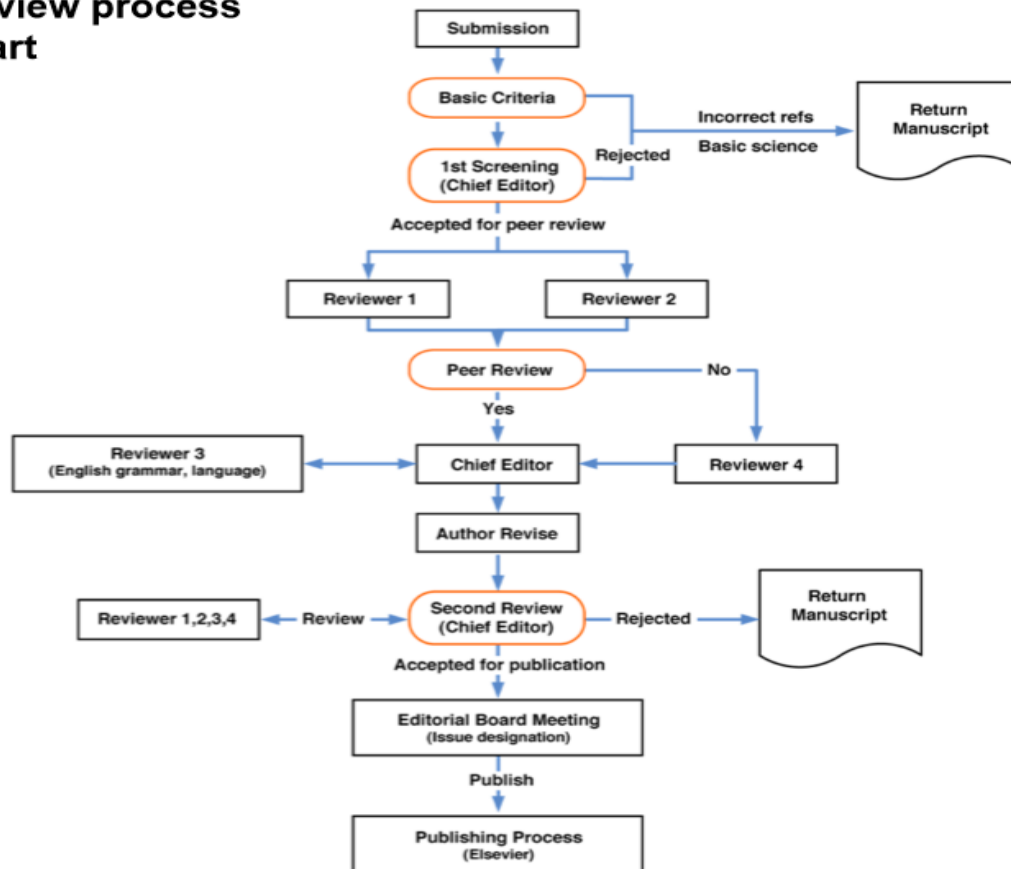
¹<http://michaelnielsen.org/blog/three-myths-about-scientific-peer-review/>

(2000) is one of the advocates of Open peer review. Openness in peer review is paramount to development of science and the question of Open Peer Review being a sound reliable science or just ‘novel’ science can be further broken down to threefold. One, does open peer review help verify the validity of scientific studies? Two, does open peer review help filter scientific studies from every “Tom Dick and Harry” journals? And three, to what extent does open peer review express novelty and openness? And lastly, Is OPR changing the role and purpose of peer review itself? To answer these questions, we should not forget that science is based on repeated experiment and open peer review is a means of evaluating the quality of the experiments or research. As per the validity and quality of scientific works, peer review has been seen by many scholars as the last hope in academics against fraudulent publications and experiments (Ali & Watson, 2016; Pöschl, 2012; Wicherts, 2016). They serve as check and balances for measuring scholarly validity and filtering of quality in academe (Gennaro, 2015; Jefferson et al., 2002; Kurdi, 2015). Conversely, in terms of openness and innovation in peer review needs more intrinsic quality of individual intelligence of the peer reviewers and the excellence of the review they produced. In the mentorship programme offered at *eLife*, the encouragement of reviewers to engage with one another by using collaborative approach to review that Open peer review enables, according to Emily Ford, a reviewer in Tony, Ross-Hellauer, OpenAire (2017) “this approach makes peer review a more robust, including more than just vetting, fact checking, and some substantial feedback”. More so, in his article², Jean-Claude Guéron suggests that knowledge should be regarded as a conversation where people should freely be able to contribute to it. The traditional peer review is too rigid, concentrating on the technical and organization means of publishing. Open peer review is a way of the future and it has come to terms where knowledge can be created, modified on a global scale, improve upon, use and reuse or recycled. Guéron concludes that contributions to knowledge as a whole should not be left for “experts” alone, others can contribute to the knowledge, share and redistributed hence, the move for openness in peer review and post publication peer reviewing is paramount where both reviewers and authors get feedback on their publications or data which can help to solve some inherent problems in traditional peer reviewing but a step ahead in scholarship (Smith & Milnes, 2016; Teixeira da Silva & Dobránszki, 2015; Twaij et al., 2014). Below is the diagram showing the processes involved in peer review.

² <http://scholarlypublishing.blogspot.my/2007/07/scholarly-communication-open-access-and.html>

Fig. 2.1: Peer Review Process Flowchart

Peer review process flowchart

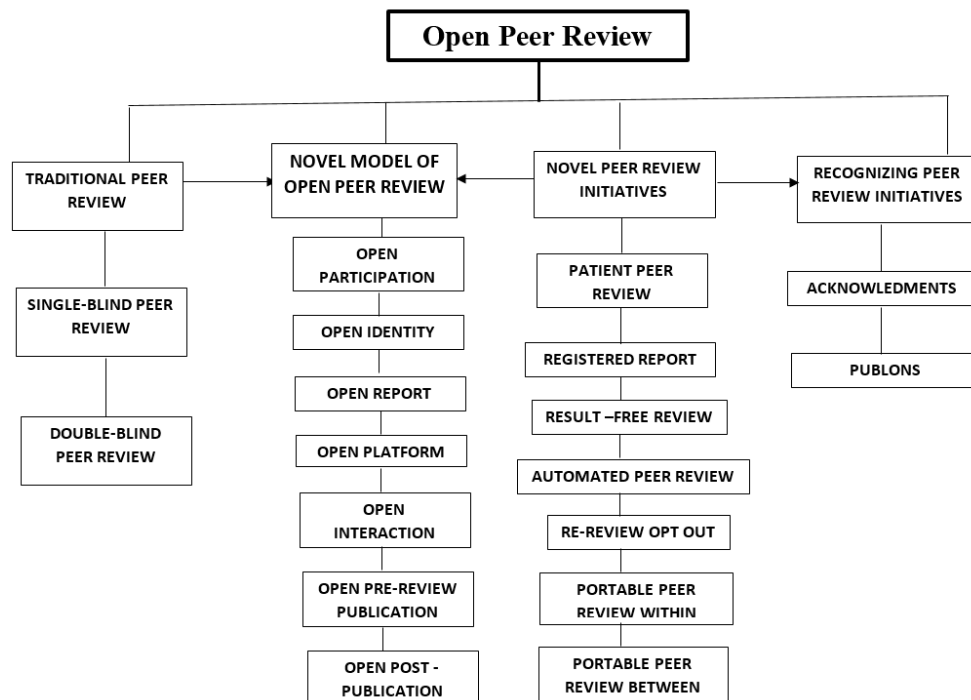


Source: <http://www.elsevier.com/reviewers/reviewer-guidelines>

3. Methodology

To examine the evidence of the effects of open peer-review processes as a sound reliable and novel science, we presented a taxonomy of open peer review after systematically examined 200 articles related to peer review and open peer review in Web of Science (WoS) (search was done in June 2017), with no limitation to date of publication. 50+ articles were relevant to our target, others that are not so much relevant to open peer review were removed. Many of these articles are (in *BMC* publications) and have passed through rigorous peer review. A taxonomy of open peer review was developed and we later explained the rationale behind this novel approach in scholarly communication in the following section.

Fig. 3.1: Taxonomy of Open Peer Review



4. Discussion

The Taxonomy of Open peer review explained

- A. **Traditional Peer Review:** Peer review has a long history in scientific communication. Single Blind and Double-Blind reviews fall into this category.
 - i. **Single-blind reviewing:** Journal editors and authors are more familiar with this kind of method in peer reviewing. It is an approach whereby reviewer's identity is hidden from the authors. The pros of this kind of peer reviewing is that reviewers may be impartial in their views, independent of authors' reputations and possible future repercussions for the reviewer's career. Nevertheless, authors argue that reviewers sometimes used delay tactics in their comments in order to allow their work to be published first (Bahar Mehmani and Joris van Rossum, 2015).
 - ii. **Transparent Peer Review:** Sometimes refers to Single-Blind Peer Review. It is an example of peer review whereby the reviewer report content (and not the names of the reviewer) followed by the publication of the article. This model enhances openness in the peer review process and allows the readers to see and read reviewers' comments. Also, Editorial remarks and comments may also be shared e.g. Editorial decision letter and the names of the reviewers (if they are pleased to sign their reports).
 - iii. **Double –blind reviewing:** in this type of reviewing, both the reviewers and authors identities are hidden. This kind of method avoid possible bias against authors and guarantee impressive and influential authors are refereed on the paper rather their statuses (Budden,

et al., 2008). However, it can be time consuming to conceal the identity of the authors and some argue that it is very hard to truly blind especially in one's study areas (Ross, *et al.*, 2006).

B. Open Peer Review in details

Open reviewing: This is the new trend in scholarly communication where reviewers and authors know one another. Few journal editors are now participating in this method e.g. F1000 Research, Biomedical, *PLoS One*, *Nature* etc. Submitted referee reports include one of three public recommendations: approved, approved with reservations, or not approved.

Referee reports, with referee names and affiliations, are published alongside the publication, and include their own formatted citations. Furthermore, community members, who are not designated referees, may publicly comment on articles and referee reports. Immediately an article receives two approved recommendations, or two approved with reservations recommendations and one approved recommendation, the article is indexed in databases such as PubMed and Scopus. Authors are encouraged to respond to referee reports as well as revise and resubmit articles. The article versions and referee reports are hosted on the publication platform, and CrossRef's CrossMark product tracks its article versioning. One of the recommended citations that provides for peer-review information, in this case is the citation of: "*Giordan M, Csikasz-Nagy A, Collings AM and Vaggi F. The effects of an editor serving as one of the reviewers during the peer-review process [version 2; referees: 2 approved, 1 approved with reservations]. F1000Research 2016, 5:683 (doi: 10.12688/f1000research.8452.2).*"

In the publishing peer review pilot study of Bahar Mehmani and Joris van Rossum, (2015), while there are mixed reactions about what open reviewing actually means. Some editors feel open peer reviewing reduces malicious comments, halt plagiarism, reduces reviewers drawing upon their own 'agenda', and supports honesty and open responses (van Rooyen, Susan *et al.*, 1999). Others differ in their argument that junior researchers may occasionally be less open for fear of affecting their own career or funding chances. However, this model has different flavours with diverse opinions according to OpenAIRE survey conducted by Tony Ross-Hellauer, Avid Deppe and Birgit Schmidt, (2017) these traits include:

- i. **Open Participation:** This is sometimes called *crowdsourced peer review* according to Ford, (2013; 2015) known as *community or public review* by (Walker and Rocha da Silva, 2015) or *public peer review* (Bornmann *et al.*, 2012). It is a process whereby a bigger community members are allowed to contribute to the reviewing process. In this model, fascinated members of the scientific group are invited to partake in the review process through active participation, structural reviews or short commentaries. The commentaries may be anonymous or registered to anyone interested or some requirements might first be obtained (for example, *ScienceOpen* required participants to have at least five publications with their ORCID profiles). From Tony Ross-Hellauer and associate findings, it was argued that all those with sufficient knowledge should be allowed to participate in review regardless of their background. Thirty-eight percent of the respondents expressed disagreement while forty-five percent agreed with it. This shows a sharp division of opinions between both sides, with strong opposition between those

who think opening participation can resolve possible conflicts linked with editorial selection of reviewers (such as biases, closed-networks, elitism) and possibly increases the reliability of peer review on one hand and those on the other hand view it as a gateway for unqualified reviewers whose credentials and motives remain hazy. However, a salient question for open participation is whether reviewers will take it upon themselves to review voluntarily? An overwhelming responses were received (85%) with the common sense proposition that reviewers are more likely to review if they are invited. Although, one of the respondents sees it as open comments on blogs or newspapers which generally attract a set of commenters who are not qualified to comment on the topic.

- ii. **Open Identities:** Ford, (2013) referred to this model as *signed peer review* and Monsen & Horn, (2007) termed it *unblinded review*. It is a review process whereby authors and reviewers know each other, unlike in *traditional peer review* either *single-blind peer review* where authors do not have knowledge of who is reviewing their papers, or *double-blind*, where both authors and reviewers' identities are concealed. However, many scholars have criticize both models (single-blind and double-blind) of detecting errors in reviewing which is unlikely to measure quality of peer review reports (Godlee *et al.*, 1998). Therefore, with openness in scholarly communication, supporters of open identity peer review argue that open identities will increase accountability and added credit to peer reviewers and making the method more fairer: as those reviewing authors work should not do it under anonymity and open identities will further improve review excellence as it is theorized that reviewers will be driven to invest quality time and care in their reviews if their names are attached to the publication (van Rooyen *et al.*, 1999).
- iii. **Open Reports:** a situation whereby a review report is published alongside the article. In Tony Ross-Hellauer (2017) study, many of the respondents were in favour of open reports believing it to improve peer review and provide useful information to readers and one-fifth thinks otherwise as a way of making it worse. In open reports, one can actually verify the criticism meted on authors whether positive or negative during the review process. Also an insight on what review process entails can be seen and learn by the young researchers who may want to go into reviewing in future. In open reports, a fundamental question arose as whether or not open reports would actually lead to improvement in review quality? In an empirical study carried out by van Rooyen, Delamothe and Evans (2010) reveals that there is no improvement in quality, however, recent Elsevier's pilot study shows improvement in overall quality of peer review reports. However, in OpenAIRE survey, respondents differ in their responses as forty-six percent believed that publishing reviews might lead to less strong criticisms and fifty-two percent agreed on disinhibiting reviewers. Equally, Nicholson & Alperin's short survey, nevertheless, found largely affirmative attitudes: "scholars... believe that open review would largely advance reviews quality, and it should be seen as a career development (Nicholson & Alperin, 2016) and finally, open reports will give early career researchers a guide –to tone, length and breadth, as well as design of review in order to help them as they peer review in the course of their career development (Hanson *et al.*, 2016).

- iv. **Open Platforms:** According to Suber (2012), Open review makes submissions open access before or after some prepublication review, and invites community comments from a dedicated platform e.g. RUBRIQ and Peerage of Science. Open platforms peer review is organized by distinct structural body as against the venue of publishing. Some comments on the platform are used by journal editors to determine whether to accept or reject the article for proper publication some also use the platform comments to complement the quality assessment of their journal. Also, these dedicated platforms sometime invites authors to submit manuscripts directly to them and they organize review among their groups and returns review reports. They equally suggest likely journals submission or sometimes contact authors with a publishing offer. Open platforms aim to reduce inefficiencies in the publication process –such as problem of duplication of effort. Unlike in the traditional peer review where manuscript submitted in a journal can be rejected and then send in another journal, such a service needs just one set of reviews which can be carried over to multiple journals until it get published in a suitable journal –sometimes refer to as “portable” review (Tony Ross-Hellauer, 2017).
- v. **Open Interaction:** This is an open mutual communication between author(s) and reviewers, and/or among reviewers themselves. Unlike the traditional peer review where reviewers and authors communicate directly with editors. There is no communication link between the reviewer and other reviewers, likewise, authors have no possibility of questioning or replying reviewers’ comments. Allowing open interaction among reviewers or between authors and reviewers or both, is a means of opening up peer review process, permitting journal editors and reviewers to work with authors to enhance their work. The rationale behind open interaction is to advance science, also, reviewers and authors could discuss challenging areas to find ways to enrich the paper, instead of rejecting it completely (Armstrong, 1982).
- vi. **Open Pre-review Manuscripts:** This model made available manuscripts immediately through –pre-print server such as arXiv, bioRxiv in order to improve any conventional peer review process. Other institutional repositories such as Zenodo and Figshare with other publisher –hosted repositories (such as *PeerJ Preprints*) permit researchers to short-cut the traditional publishing practice and make their manuscripts immediately accessible to all levels of inquiry people. This model complement a more conventional publishing process, with comments invited on pre-print and then merged into modifying manuscript which later pass through peer review with a journal. On the other hand, overlay peer review such as (*Discrete Analysis*) can enhance effective publishing platforms at reduced cost (Boldt, 2011; Perakakis *et al.*, 2010; Day, 2015). *ScholarOpen* in conjunction with *OpenAIRE* developed open source software plug-in that add overlay peer review attributes to repositories using DSpace software (OpenAIRE, 2016). Also, new innovation of adding altmetrics and other related information that was developed by *ScienceOpen* offers a new way in ingesting articles metadata from preprint servers and contextualization before offering authors peer review. This kind of approached was first used in online journal of Electronic Transactions in Artificial Intelligence (ETAI) in 1997, where a two–way review process was used. One, the manuscripts were made available immediately online for

- group discussion, before subjecting to standard anonymous peer review (Sandewall, 2012). A related multi-stage system of peer review was made instantly accessible as “debate papers” for group comments and peer review (Pöschl, 2012). Other recent example of Open Pre-review manuscript is that of F1000Research. The merit of this model is that scholars can establish the importance of their report findings, also, publishing report findings earlier boosts its visibility, enhances Crowdsourcing in peer review (where commentaries are made available to everyone), and furthermore, improves the quality of original manuscript submissions (Pöschl, 2012).
- vii. **Open Post Publication:** This is sometimes call open final-version commenting (Tony Ross-Hellauer, 2017). Review or commenting on post-publication is illogical if the aims of peer review is to improve in selecting manuscript for publication. However, in a literal sense, even the declared fixed version –of –record continues to pass through rigorous reviews. The WWW has a corpus of huge information daily and readers offer their feedback to scholarly works and so commenting on post-publication offered readers a voice on multiple channels as again the traditional route. Today, journals device a means of commenting on their websites. In the study of Walker & Rocha da Silva, (2015), found that of 53 publishing venues reviewed, 24 provided facilities to enable user-comment on published articles. However, these are seldom used. Also, in the survey of (Mulligan *et al.*, 2013), half of their respondents believing supplementing peer review with some post publication commentary is beneficial. Although, users have access to other social media platforms –such as Mendeley, Academia.edu, ResearchGate, and Twitter where they can comment or publish their thoughts and views. The integrity of this piece of work is a work in progress in the scholarly communication. Also, in the realm of *Living Reviews* where published articles are open to future corrections and retraction for misconducts in the past. Such retraction and corrections are always fuel by social media, for example in the 2010 case of #arsenic-life, where social media critique over flaws in the methodology of a paper claiming to show a bacterium capable of growing on arsenic resulted in refutations being published in Science. A blog called *Retraction Watch* is dedicated for such service. Another influence of Open Post-Publication is an independent platform *Pubpeer* which claims its “post-publication peer review platform easily out performed even the most careful reviewing in the best journal. The paper’s comment threads have attracted over forty thousand viewers, it is hardly surprising they caught issues that three overworked referees and a couple of editors did not. Science is now able to self-correct instantly. This shows that Post-Publication peer review is here to stay, according to (PubPeer, 2014).

However, each of these models provide unique factors and methods for openness and targeting contrary challenges. For instance, *disclosure of identities* aims usually at increasing accountability and reducing bias, and further enable credit for peer reviewers (van Rooyen et al., 1999). Therefore, “reviewers or referees should be more highly motivated to do a competent and fair review if they have to defend their views to the authors and if they will be identified with the published papers” (Armstrong, 1982). Also, *open report* tackles issues of incentive i.e. reviewers should get credit for their work (Kratz and Strasser, 2015), and wastefulness (reports can be

consulted by the readers) (Tony Ross-Hellauer, 2017). More so, these models need not necessary be linked but can be employed distinctly: *open identities* can be disclosed without reports being published while *open reports* published with reviewer names withheld. In the case of *open participations* lead to wider coverage, and open platform allows others to contribute or enhance the peer review decision by the editors on the manuscript. *Open interaction* enables direct reciprocal discussion between authors and reviewers, and/or between reviewers, is allowed and encouraged, *open pre-review manuscript* ensures manuscripts are made immediate available (for example via pre-print servers such as arXiv) in improve of any formal peer review process and finally *open post-publication* enables review or commenting on the final “version of record” publication.

C. Open Peer Review New Initiative

- i. **Patient Peer Review:** This is a new model initiated in Open peer review. It is a model whereby all research articles related to health and social care and as well focus on patient and wider involvement and engagement of research at all stages. In this approach, all articles within the reach of research Involvement and Engagement are over seen by patient and academic Editor Pair and are reviewed by at least two academics and two patients.
- ii. **Registered Report:** The rationale behind this initiative is the study proposal and methodology. The study and the proposed methodology are pre-registered with the journal and submitted for peer review before data are collected for the study. One of the merits of this initiative is that once the methodology and the questions in the manuscripts are cleared by the reviewers, thence, the registered report is accepted in principle irrespective of the outcomes of the study. This type of peer review also reduces bias in publication. Some journals in BMC are practicing this novel initiative e.g. BMC Biology Editorial.
- iii. **Results-Free Review:** This is another initiation in peer reviewing, where the editors and reviewers are blind to the results of a completed study and focuses on editorial decisions, rationale and methodology alone. This type of peer review is very similar to Registered Report, but the key difference is the final outcomes which are already known but withheld from the peer reviewers from the beginning to avoid bias in the peer review process. However, if the manuscripts (excluding results and discussion) is accepted for publication, peer review of this entire manuscript later take place to ensure conformity to the methodology, results and conclusion.
- iv. **Re-review Opt Out:** This new innovative model in peer review allows authors to avoid multiple round of re-review by allowing authors decide whether their manuscript to be seen by reviewers again after revision or for Editors to make the final editorial decision. The rationale behind this peer review is to eliminate delay and enhanced faster publication (Janowicz & Hitzler, 2012).
- v. **Automated peer review:** Artificial intelligence is being incorporated into peer review today. A text mining and machine learning algorithms are to assess basic statistical reporting in manuscript submitted by authors. This text mining and machine learning

algorithms are to report relevant peer review guidelines on issues of methodology used and the likes. Editorial policies, and sets of strategies designed to speed up the process and reduce editors' task can be improved upon using automated peer review tactics. Also, the issues of fighting plagiarism, bad statistics, bad reporting, data fabrication and copied text or paraphrasing that real reviewers would find difficult to unearth can be detected by this machine learning algorithm (DeVoss, 2017). Presently, three BMC journals are involved in part one of the pilot, *Trials*, *Critical Care and Arthritis Research and Therapy* and discussion on part two is underway. Similarly, a study was carried by *PLoS ONE* using Cartesian Genetic Programming, a nature-inspired evolutionary algorithm that can melodramatically redouble editorial stratagems. In their study, the artificially developed approach reduced the duration of the peer review process by 30%, without combining the group of reviewers (as compared to a typical human-developed method). The results of the study demonstrate that genetic programs can improve real-world social systems that are usually much harder to understand and control than physical systems. Automated peer review is a work in progress for editors as things will unfold as scholarly communication continues in the academe.

- vi. **Portable Peer Review Within and Between Publishers:** This is a new model for publishers pioneered by BMC in order to increase the efficiency of peer review process for authors, reviewers and editors. They facilitate this type of peer review within and between other publishers and third parties. They also welcome submissions of manuscripts originally peer reviewed by the Peerage of Science community initiative as well as other manuscripts rejected by other journals based on interest. They also collaborate between manuscripts transfer from participating journals accompany reviewers' reports if they desired.
- vii. **Expedited peer review:** This is another novel approach in peer reviewing whereby scientifically sound, high quality manuscripts that are turned down from some broad-scope "high-impact" journals based on the issue of "general interest" can be accepted elsewhere provided such manuscript is submitted together with the original peer reviewers' reports, letter of rejection and brief rebuttal of reviewers' comments. Journal like *Epigenetics & Chromatin* does this presently.

D. Recognition for Peer Review

- i. **Reviewer's Acknowledgements:** peer reviewers are fundamental to scientific communication and so publishing editors need to appreciate these reviewers in order to continue their good works to the scholarly community. Rewarding is a primary goal for scholarly communication and so in the study of Kratz and Strasser (2015), acknowledgements was ranked highly at 93(62%) out of 126 common answers in given credit to reviewers. Publishers and journal editors can appreciate reviewers by publishing annual reviewers' acknowledgments. They can also award them for the good job well done throughout the year and also encourage them in many ways for their contribution to the scientific world. Also recently, in PeerViewer research, monetary compensation is ranked high where the expert in the field can get paid by the editors when they evaluate research articles of scholarly sources from journal

publications. This payment would not make the reviewers rich, according to PeerViewer, but shows expression of thanks for their service, time and hard work³.

- ii. **Publons:** This is a service rendered by a global community of reviewers which seamlessly tracks, verifies and showcases peer review activity across all disciplines and allow reviewers to showcase their activity. Publons seeks to address the problem of incentive in peer review by turning peer review into measureable research outputs. Publons collects information about peer review from reviewers and publishers to produce reviewer profiles which detail verified peer review contributions that researchers can add to their CVs. They store a record of every manuscript a reviewer handle and manuscript handled by an editor, for a journal in the world, in full compliance with all editorial policies. This set of reviewers need to be appreciated for this initiative in peer reviewing to scholarly outputs. In 2017 they got award for keeping watch over science and research everywhere⁴, more can be done.

5. Conclusion

To make open peer review a sound and reliable novel science, several options can be employed for example, the work of Smith (2006), provides the urgency open peer review needs in order to make it sound, reliable and retain its kingship in academics as followed: standardizing procedures; opening up the process; blinding reviewers to the identity of authors; reviewing protocols; training reviewers; being more rigorous in selecting and deselecting reviewers; others are using artificial intelligence or electronic review; rewarding reviewers; providing detailed feedback to reviewers; using more checklists; or creating professional review agencies. It might be, however, that the best response would be to adopt a very quick and light form of peer review—and then let the broader world critique the paper or even perhaps rank it in the way that Amazon asks users to rank books and CDs (Ali & Watson, 2016; Wierzbinski-Cross, 2017; Yaffe, 2009).

Nevertheless, peer review can only performed credibly well if those involved have a clear idea as to its central drive. From Smith's options one can deduced that peer reviewing have a lot to correct in scholarly communication and encourage quality and innovation in academics which is the way to make peer review open.

³ <http://peereviewer.com/principles-behind-peer-review/>

⁴ . Publons. Publons. Accessed August 28 2017 at <http://home.publons.com/>.

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